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ABSTRACT

This booklet describes the African Virtual University (AVU), an interactive instructional telecommunications network established to provide distance education to the countries of sub-Saharan Africa. The AVU was piloted in 1997-1998, and in the 1998-1999 academic year, 27 institutions were slated to offer AVU courses. Supported by the World Bank, the AVU offers new technologies to overcome barriers to higher education in Africa. The program appears to be a promising innovation, but pertinent issues related to sustainability require serious consideration. Among these is the issue of cost. The program is heavily capital intensive, especially in the purchase and maintenance of the satellite receiver equipment, which the universities will have to shoulder when World Bank assistance is phased out. With proper management, accountability, strategic planning, and marketing of AVU programs, there is great hope and promise for the AVU to revitalize university systems in Kenya and elsewhere in sub-Saharan Africa. (Contains 19 references.) (SLD)

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African Virtual University

The Case of Kenyatta University, Kenya

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HE035584

CASE STUDIES IN EDUCATION:
A COMMONWEALTH VIEW

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Contents

Introduction	1
Background to the African Virtual University (AVU)	3
The Implementation and Current Status of AVU	4
The Implementation of AVU at Kenyatta University	6
The AVU Network	7
The AVU Pilot Programmes in Kenyatta University	9
An Analysis of University offered through AVU Satellite	10
The First AVU Semester (1 October-23 December 1997)	16
Performance in AVU Courses	17
AVU's Pre-University Programme	22
The Management of AVU	24
The Impact of AVU on Kenyatta University	30
The Challenges	34
The Way Forward for the AVU Project at Kenyatta University	36
Summary and Conclusions	38
References	39

5

Introduction

African higher education has witnessed unprecedented expansion in the past few decades. Many African countries which had a single university at independence now (1998) have several universities and colleges. With the achievement of independence in the 1960s by most African countries, the rate of expansion has averaged 11 per cent per year for the past 30 years, with enrolment increasing from around 21,000 in 1960 to around 500,000 by the mid 1980s.

Kenya is among the countries that have experienced an explosive growth in university education in the last 20 years or so. From one university (the University of Nairobi) with a student population of 2,786 in 1970, there are now five public universities in Kenya – namely, Nairobi, Kenyatta, Moi, Egerton and Jomo Kenyatta University of Agriculture and Technology. The student enrolment rose to around 40,000 in the 1991–92 academic year. In the 1996–97 academic year, enrolment declined significantly by 5.2 per cent to stand at 37,973 against 40,065 students in the 1995–96 academic year. The drop is explained partly by the gradual graduation of the double intake of students admitted in the 1990–91 academic year, and partly by the inability of some parents to pay college fees (Republic of Kenya, 1997:201).

The rise in student numbers has also meant growth in the teaching staff. The size of the university teaching staff quadrupled from 434 in 1970 to 1,800 in 1989, coinciding with a significant rise in student enrolments during this time. Although the proportion of Kenyans on the academic staff is over 80 per cent, poor remuneration compared with other sectors has resulted in many vacancies and the hiring of less qualified staff. A high proportion of staff are Master's degree holders. Competition for qualified staff among the public universities has also resulted in uneven promotion criteria.

The growth in enrolment is mainly a consequence of the insatiable public demand for higher and higher levels of education, as primary and secondary levels can no longer guarantee modern sector wage employment. Related to this is the nature of Kenya's reward structure which favours those with formal education qualifications who are engaged in wage employment in general and professional employment in particular. However, public demand has been an important factor influencing university growth, mainly because university education has experienced increasing politicisation. Thus the main initial justification for university expansion – the need for the generation of skilled, high-level manpower – has been replaced with a political one in which university expansion is seen more in terms of its political potentials to equalise economic opportunities at both the individual and regional levels (Sifuna, 1997).

With regard to funding, in recent years higher education has been funded more substantially than any other level of education. Higher education's share of the 1992–93 Government allocation, for example, amounted to 19 per cent of the national recurrent budget for education and over 56 per cent of the Government's development budget (funds for building, equipment and other capital investments). National recurrent budget expenditures per student in public universities for 1992–93 were 46 times higher than those for each primary school pupil. In other words, higher education is mainly funded by the Government. Students are required to pay nominal fees, amounting to roughly 10 per cent of the total Government recurrent expenditure for higher education.

Despite the astronomical Government expenditure on higher education, the rapid expansion of university education and increased enrolment have not been accompanied by a commensurate rise in the level of Government funding, to ensure a high quality of instruction. There are therefore serious problems in the public universities related to

instructional quality, class sizes and availability of materials and facilities.

This state of affairs prevails in the five public universities, although each of them has its own peculiar problems. For example, enrolment at Kenyatta University went up by 5 per cent to 8,574 students in the 1996–97 academic year. In this period the University enrolled a total of 294 postgraduate students, of whom 133 were pursuing doctoral degrees (Republic of Kenya, 1997:292). These student numbers were not matched with the provision of teaching facilities and resources, especially in Science where laboratories and equipment intended for 30 students were now used by ten times that number. The calibre of the teaching staff did not improve the situation.

Background to the African Virtual University (AVU)

The essential problem confronted by university managers, academic staff, Government policy makers, graduate employers, students and their families is that the quality of university education in Africa has declined significantly. This is true regardless of how quality is defined: student performance on standardised test; academic staff credentials; student exposure to current knowledge and information; relevance of learning to labour market requirements, and academic capacities for development in Africa – on the whole, all have been declining. A significant opportunity is created by AVU to catalyse constructive action in this arena. The AVU model will assist in tapping the potential offered by new technologies to overcome some of the financial, physical and information barriers that prevent increased access to high quality education in Sub-Saharan Africa.

Furthermore, the emergence of the virtual university model presents an exciting opportunity. For instance, the growth of new technologies makes possible the creation of virtual universities where quality professors,

libraries and laboratories can be shared by people and organisations in physically unconnected places. The pedagogical advantages afforded by the model of virtual universities are even more significant: they enable the creation of more current programmes of studies and curriculum content at Kenyatta University in fields such as computer science and computer engineering which do not exist as programmes of study in the University. The introduction of short courses – Internet Access; C++ Computer Programming; Computer Architecture and Design; Introduction to Engineering and the virtual seminars add a new dimension in augmenting and supplementing current university programmes. The new courses provided by the AVU model adapt to demand and keep up with the latest advances in disciplines of studies.

Essentially, AVU is a concept or model of distance education that uses a technological mode of instructional delivery. It is the first of its kind – an interactive, instructional telecommunications network – established to serve countries of Sub-Saharan Africa. It is funded by the World Bank, with headquarters in Washington DC. AVU's mission is to use the power of modern information technologies to increase access to educational resources throughout Sub-Saharan Africa. Its objective is to build world-class degree programmes that support economic development by the education and training of world-class scientists, technicians, engineers, business managers, health care providers, and other professionals.

The Implementation and Current Status of AVU

AVU is being developed and implemented in three phases. First, the prototype/pilot phase, which was implemented in 1997–98. The purpose of this phase was to establish partnerships with institutions of higher education throughout Sub-Saharan Africa, in order to offer technology-based credit courses and non-credit seminars using digital-satellite technology.

A successful prototype service phase will provide the foundation for the second phase of AVU, which will include offering complete undergraduate degree programmes from leading universities world-wide, beginning in 1999.

The third phase of AVU will follow with the development and offering of science and technology curricula from one or more partner institutions in Sub-Saharan Africa. The full implementation of the third phase will be resource sharing of technology-based degree programmes among institutions of higher education throughout Sub-Saharan Africa.

For the 1998–99 academic year, the following 27 institutions will offer AVU courses:

- Addis Ababa University, Ethiopia
- Cape Verde Higher Education Institute, Cape Verde
- Egerton University, Kenya
- Kenyatta University, Kenya
- Kigali Institute of Science and Technology, Rwanda
- Loko Vocational School, Ivory Coast
- Makerere University, Uganda
- National University of Rwanda, Rwanda
- National University of Science and Technology, Zimbabwe (NUST)
- Open University of Tanzania, Dar-es-Salaam, Tanzania
- Togo University, Benin
- Uganda Martyrs University, Uganda
- Uganda Polytechnic, Uganda
- University of Abidjan, Ivory Coast
- University of Abou Moumouny of Niamey, Niger

- University of Benin, Benin
- University of Cape Coast, Ghana
- University of Cheikh Anta Diop, Senegal
- University of Dar-es-Salaam, Tanzania
- University of Eduardo Mondlane, Mozambique
- University of Ghana, Ghana
- University of Mozambique, Mozambique
- University of Namibia, Namibia
- University of Noukchott, Mauritania
- University of Ouagadougou, Bokina Faso
- University of Science and Technology, Ghana (UST)
- University of Zimbabwe, Zimbabwe

The Implementation of AVU at Kenyatta University

As a distance educator I was sponsored by Kenyatta University to attend a conference on Distance Education in Washington DC in October 1996. Etienne Baranshamaje, architect of the AVU model, presented a paper at the conference and, surprisingly, Kenya had been excluded from countries listed to participate in the project. I discussed with Mr Baranshamaje the possible involvement of Kenya – particularly Kenyatta University – in the project. After the conference, I briefed our Vice Chancellor on the possibility of Kenyatta's involvement, and he quickly contacted the World Bank, which readily incorporated Kenya, and Kenyatta University in the pilot phase.

The AVU inaugural workshop in Addis Ababa in February 1997 was attended by a contingent of five people from Kenyatta University. Soon

after, the contract was signed between the Kenya Government, the World Bank and COMSAT – the supplier of satellite equipment. Preparations for installations and renovations were completed, and the Satellite Receive Terminal was installed in June 1997. For Kenyatta University, AVU has come at an opportune moment to revitalise and supplement existing academic courses. The main goals and objectives of AVU are as follows:

- To provide quality and relevant courses in science, engineering and computer science, and short-term courses in related fields.
- To increase enrolment of students in highly demanded science and technology fields.
- To provide university education to deserving students who may have missed admission due to limited opportunities.
- To provide high quality and relevant professional courses and seminars to top-level managers, journalists, and teachers in relevant areas.
- To offer a structure that can generate income and revitalise some of the financial hardships experienced at the university.
- Capacity building for professors, lecturers and students in computer skills.

The AVU Network

Content production

The AVU network configuration originates at the studio location on the premises of the content-producing institution, or in a nearby facility leased by the institution. Each content site includes all equipment necessary for the origination of both live and pre-recorded instructional programmes, and for the provision of these programmes to either a local or a remote INTELSAT-compatible uplink earth station. The studio also

includes equipment necessary to provide certain levels and kinds of interactivity, such as audio talkback for live programmes, and to facilitate such other related functions as satellite files. The personnel on location consist of the professor or lecturer and, typically, a programme technician. The broadcast can be either live or videotaped.

Satellite transmission

The signal from the content site is transmitted via a local provider, currently the Indiana State University system, to an uplink facility in Washington DC. AVU is currently contracted with COMSAT to relay the signal from Washington DC to Africa by way of the INTELSAT satellite system. AVU currently enjoys unlimited usage with INTELSAT who, in the pilot phase, has donated the equivalent of US$2,000,000 of satellite capacity to the project. The Technical Officer of AVU manages the network system.

Local support

Each SSA (Sub-Saharan Africa) partner institution is provided with all the equipment necessary to receive digital satellite transmission and a full complement of AVU programmes and services. The current funding source (roughly equivalent to US$54,000 per university) is the World Bank. In the future, funding for local infrastructure will be provided by the AVU franchise centres. The outdoor equipment provided by AVU includes the receive-only satellite antenna and necessary electronic equipment, integration hardware, and cabling. The indoor classroom equipment is designed to be 'user-friendly' and to enable maximum flexibility in the use of AVU programmes and services.

The indoor equipment unit includes two or more digital video receiver–decoders; one or more television monitors; one or more video cassette recorders; two multimedia personal computer systems; a push-to-

talk telephone; a printer; a facsimile machine; a monitor and control (M&C) unit; a custom-designed equipment cabinet, and other miscellaneous components to help ensure ease of operation and uninterrupted programme reception. A comprehensive data handling and communications system has been designed to receive, store and process incoming high-speed broadcast data channels, and to provide each receiving site with an outbound data/audio talk-back link.

Classroom

The typical AVU classroom has been between 30 and 40 students, sitting at their desks watching the videotaped or live broadcast on a television monitor. During live broadcasts, students have the opportunity for real-time two-way interactivity with the instructor and the ability to collaborate with other students.

The AVU Pilot Programmes in Kenyatta University

During the pilot phase, AVU had three semesters during which courses were transmitted from universities in Canada, Europe and America (Table 5).

All the students registered for these AVU courses were regular, on-campus students from departments of physics, mathematics, chemistry, and appropriate technology, which are part of the Faculty of Science. However, some of the core courses, including Introduction to Engineering, Computer Architecture and Design, and Introduction to Internet are not offered in Kenyatta University.

Table 1. AVU Courses during the Pilot Phase

Course	*Origination*
Calculus I	New Jersey Institute of Technology (USA)
Calculus II	New Jersey Institute of Technology (USA)
Computer Organisation and Architecture	Colorado State University (USA)
Differential Equations	New Jersey Institute of Technology (USA)
Introduction to C++ Programming	Mount Saint Vincent University (Canada)
Introduction to Computing	University of Massachusetts (USA)
Introduction to Engineering	Georgia Institute of Technology (USA)
Introduction to Internet	University of Massachusetts (USA)
Organic Chemistry	Laurentian University (Canada)
Physics	Carleton University (Canada)

An Analysis of University Courses Offered through AVU Satellite

Enrolment has been increasing since the first courses were offered in the 1996–97 academic year. The trend in total number of students who did their units through the AVU's satellite facility is reflected in Table 6 and Figure 1.

Gender disparity is evident, with males outnumbering females in almost all the units, as shown in Tables 7, 8 and 9. Figures 2, 3 and 4 represent this information graphically.

Women's participation in AVU courses is no different from the national representation of girls in university, where less than 30 per cent are

women. The picture is worse in facilities such as engineering and computer science. For instance, in Kenyatta University, women constitute 23 per cent in the Faculty of Science. This means that a relatively small number of women opt for AVU courses, as compared with men. This imbalance does not start at university, but at primary level. Studies indicate that Science and Mathematics are generally perceived to be 'masculine' subjects. The negative perception about girls' ability to study sciences, and other factors related to cultural attitudes, poverty and poor performance, contribute to the low level of participation of girls in science subjects at tertiary level.

Table 2. Enrolment in University Units and Courses Offered through AVU Satellite

Course	*Number of students enrolled*			
	Summer semester	*Semester 1 1997*	*Semester 2 1998*	*Total*
Calculus I	28	41	41	**110**
Calculus II	–	55	57	**112**
Computer Architecture and Organisation	–	–	41	**41**
Differential Equations	–	–	12	**12**
Introduction to C++ Programming	–	–	28	**28**
Introduction to Computing			20	**20**
Introduction to Engineering	–	–	20	**20**
Introduction to Internet		47	26	**73**
Organic Chemistry	–	–	31	**31**
Physics	–	24	23	**47**
Total	**28**	**167**	**299**	**494**

Table 3. Enrolment of Students in the First AVU Semester, 1 October –23 December 1997

Course	*Number of students*			
	Females	*Males*	*Total*	*Dropouts*
Calculus I	13	28	**41**	11
Calculus II	9	46	**55**	22
Introduction to Internet	6	41	**47**	6
Physics	0	24	**24**	3
Total	**28**	**139**	**167**	**42**

Table 4. Enrolment of Students in the Second AVU Semester, 26 January–15 May 1998

Course	*Number of students*			
	Females	*Males*	*Dropouts*	*Total*
Calculus I	10	20	11	**41**
Calculus II	7	26	24	**57**
Computer Architecture and Organisation	3	34	4	**41**
Differential Equations	3	9	–	**12**
Introduction to C++ Programming	2	26	7	**28**
Introduction to Computing	4	16	–	**20**
Introduction to Engineering	2	18	–	**20**
Introduction to Internet	5	21	–	**26**
Organic Chemistry	1	29	1	**31**
Physics	0	17	6	**23**
Total	**30**	**169**	**46**	**245**

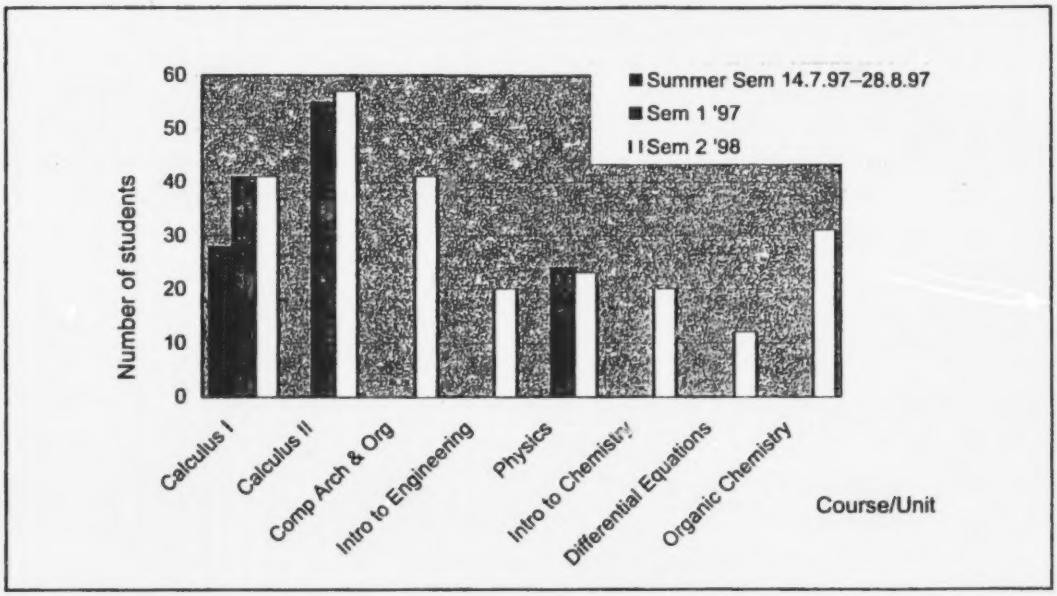

Figure 1. Enrolment in University Units and Courses Offered through AVU's Satellite, 1997–98

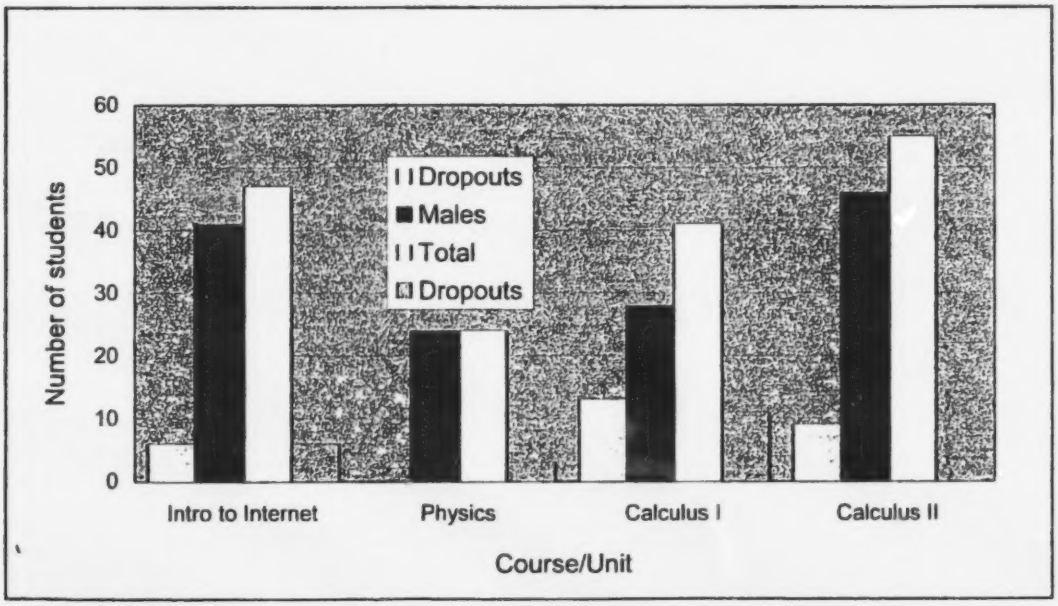

Figure 2. Enrolment in University Units and Courses Offered through AVU's Satellite, 1997–98, by Gender

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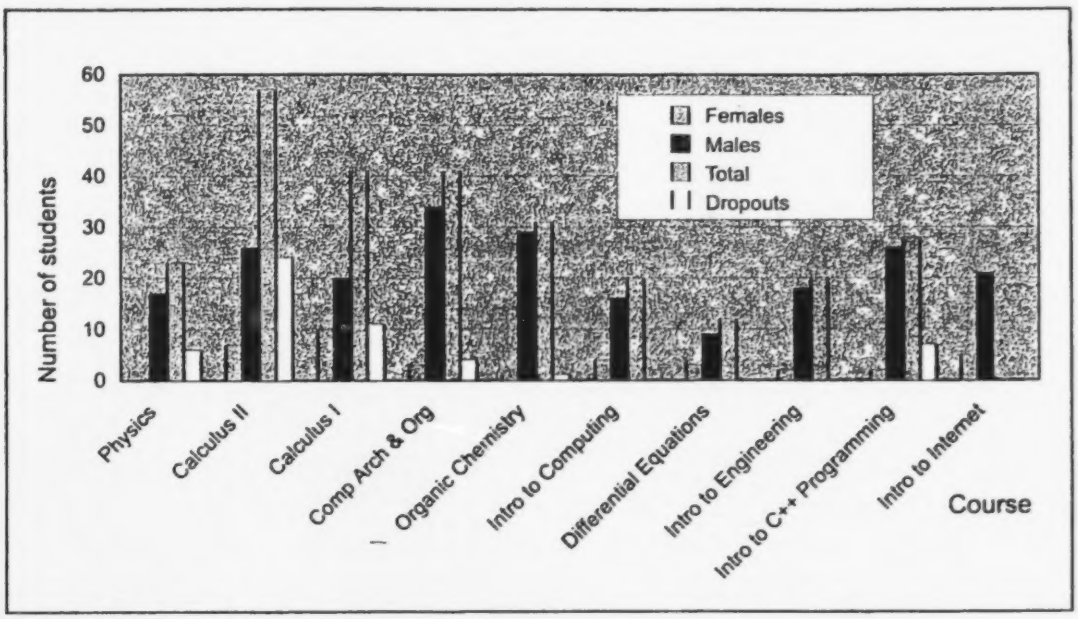

Figure 3. Enrolment in AVU Units and Courses, Second Semester, 26 January–15 May 1998, by Gender

Calculus I

Twenty-eight students from the Department of Mathematics at Kenyatta University registered for the AVU Summer Semester opted for an AVU course in Mathematics, Calculus I, originating from New Jersey Institute of Technology (NJIT), USA, and delivered by Professor Rose Dios (Table 5). Students' comments about the course, reproduced here and on page 60, show how much they enjoyed these lectures.

Table 5. Enrolment in AVU's 'Calculus 1' Course, Summer Semester, 1997

Course	*Number of students*		
	Females	*Males*	*Total*
Calculus I	6	22	28

The other Mathematics students continued with their traditional

Kenyatta University lecturer during the summer semester. Two continuous assessment tests and one final examination were given at the end of the semester. The local AVU instructor from the Mathematics Department set and marked the examination, which experienced a pass rate of 80 per cent compared with a mere 40 per cent in the traditional mode of delivery (which, as pointed out by the teacher who taught both courses, consists of lectures and a few demonstrations).

It is important to mention that for all courses except for Internet and Introduction to Computing, interested students from related departments at the University register for AVU courses. Before AVU was adopted at Kenyatta University, the Senate approved the integration of AVU pilot phase courses in the Kenyatta University curriculum. Therefore semester grades from AVU courses were computed along with other grades in the respective departments. Two groups of students, one taking the traditional course and the other the AVU course, provide an opportunity for comparison in terms of participation and performance.

> *'Professor Dios is a very good teacher because her lectures start with simple examples and build slowly to complex examples, i.e. from "known to unknown". This approach enables me to understand and enjoy Mathematics.'* Personal interview, first Calculus I student

> *'It has taken me two times to retake Calculus I examination without passing. I had given up on Calculus I if it were not for AVU Calculus I course which I managed to pass. It was possible to pass because AVU courses provide textbooks, comprehensive notes, tutorial sessions, interaction with an instructor in America and a local university lecturer who always explains concepts during tutorials. During revision, we get pre-recorded videotapes to review lectures. Therefore, all these benefits enabled me to pass.'* Female student, personal interview

The First AVU Semester (1 October–23 December 1997)

The full semester of the pilot phase started in October. The registration of students is shown in Table 3.

> *'Before I joined AVU courses, I had never seen a computer nor sat before a keyboard, but from the Internet course, I have known how to use the computer, send e-mail, design websites and access courses, data etc. from the websites.'* Personal interview, AVU student

> *'I am only a third year Physics student, from very poor family background, struggling to complete fourth year fees for January 1998. Fortunately, after my Internet examination in December 1997, I managed to apply for a job with Commercial Bank of Africa, Nairobi, attended an interview, performed very well in both theory and practicals, and was employed even before completing my degree course in Physics and Mathematics. The AVU Internet course has earned me a job!!'* Interview, AVU student, December 1997

Introduction to Internet

This course generated a great deal of enthusiasm from students, faculty members and the general public (as is demonstrated by the comments on this page). It was oversubscribed, with more than 400 students registering, but due to limited facilities only 40 students were admitted to the course. A loan of Ksh 5 million (US$86,000) from the University was given to AVU to purchase 20 computers and one projector for internet training, and a separate laboratory was created for training. AVU–Kenyatta instituted income-generating measures to offset the loan and meet some of the running costs of AVU. Students paid Ksh 15,000 (US$280) per semester for the Internet course. Of the first Internet class, 22 students have been employed by companies in Nairobi.

Performance in AVU Courses

Performance in AVU courses and units has been good, except for Calculus I and Computer Architecture and Organisation, whose average scores were below 50 per cent during the Summer semester and the Second semester in 1998. Performance has been particularly good in computer-related courses, with average scores of over 70 per cent for the last two semesters (Table 6 and Figure 4).

Table 6. AVU Course Performance, by Semester

Course	*Average marks*		
	Summer sem. 1997	*Semester 1 1998*	*Semester 2 1998*
Calculus I	46	51	–
Calculus II	–	–	51
Computer Architecture and Organisation	–	–	46
Differential Equations	–	–	63
Introduction to C++ Programming	–	–	76
Introduction to Computing	–	–	78
Introduction to Engineering	–	–	61
Introduction to Internet	–	77	74
Organic Chemistry	–	–	62
Physics	–	56	–

Apart from AVU semester programmes, which targeted campus students, there are short computer courses (Table 7) lasting from two weeks to one or two months, depending on the nature of the course. These courses run from 0800 hours to 2200 hours and are open to the public for professional upgrading and continuous learning. The target groups include civil

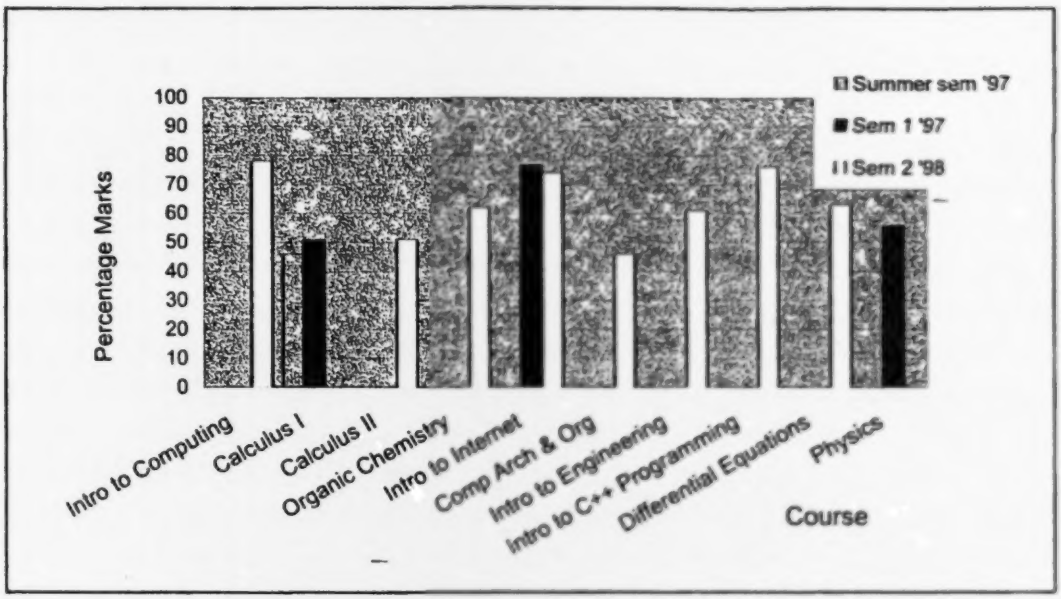

Figure 4 AVU Course Performance, by Semester

Table 7. AVU Short Computer Courses

Code	*Title*
AVU 01	Introduction to Microcomputers and MS-DOS
AVU 02	Windows '95
AVU 03	MS Word '97
AVU 04	MS Access '97
AVU 05	MS Excel '97
AVU 21	Using Internet
AVU 22	Advanced Internet
AVU 31	C++ Programming
AVU 34	Visual Basic Programming

servants, people working for organisations such as banks, ministries, parastatals and universities, graduates, doctors and school leavers. Enrolment figures for these courses are shown in Tables 8 and 9.

Table 8. Enrolment in AVU Short Computer Courses, by Phase

	Duration	Females	Males	Total
Phase 1	29 May 1998 to 24 July 1998	87	189	276
Phase 2	27 July 1998 to 2 October 1998	125	337	462
Phase 3	12 October 1998 to 18 December 1998	106	125	251

Table 9. Enrolment in AVU Short Computer Courses per Phase, by Course

	Phase 1	Phase 2	Phase 3	Total
AVU 01	57	116	105	278
AVU 02	62	97	92	251
AVU 03	45	67	–	112
AVU 04	41	66	–	107
AVU 05	40	65	–	105
AVU 21	13	23	21	57
AVU 22	10	20	14	44
AVU 31	8	8	–	16
AVU 34	–	–	19	19
Total	276	462	251	989

Statistics and the summary graphs show that enrolment in the AVU short computer courses has been very good. The most popular course, Introduction to Microcomputers and Ms-Dos, enrolled more than 100 students in the last two phases. Enrolment has been higher for males than for females, but this discrepancy is decreasing with time, as reflected in Figures 5, 6 and 7.

Phase 2 recorded the highest number of students in most of the courses, but a valid conclusion about the enrolment trend can only be made after Phase 3. We can only note that there is a slight decline in enrolment, as reflected in Figure 8.

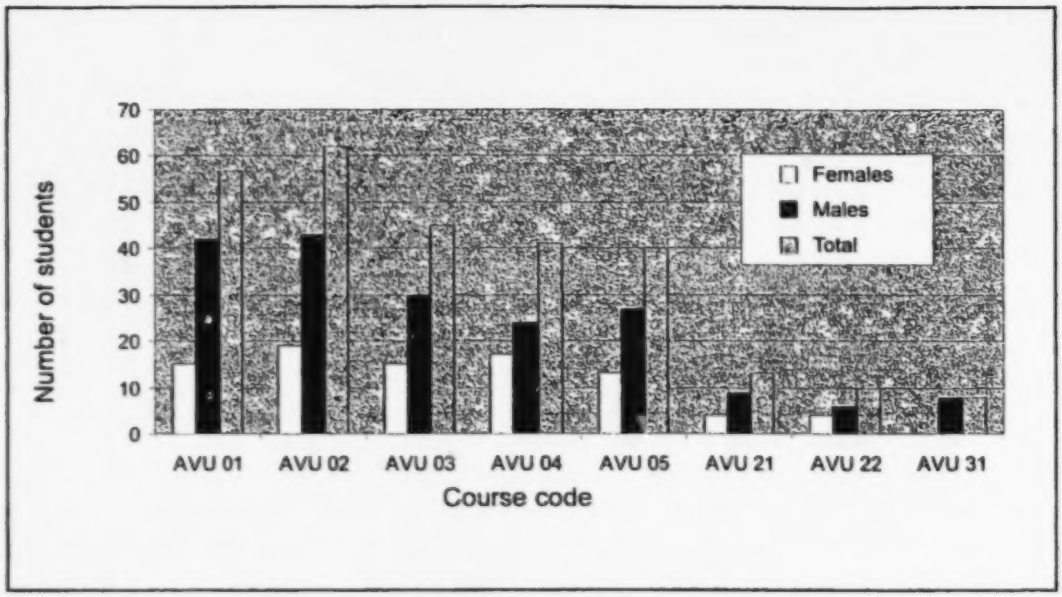

Figure 5. Phase 1: Enrolment in AVU Short Computer Courses

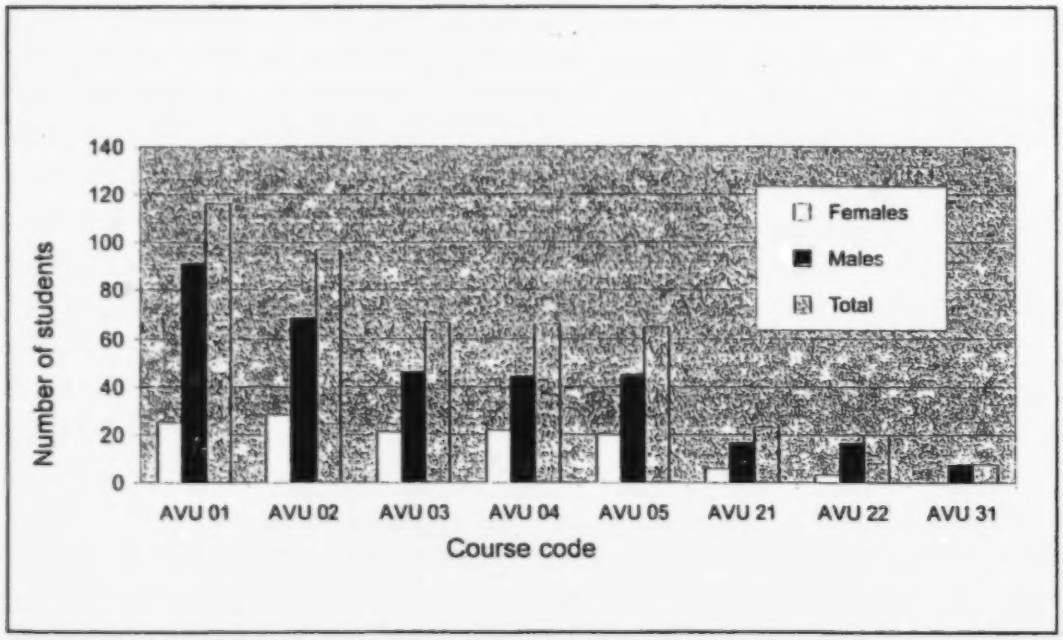

Figure 6. Phase 2: Enrolment in AVU Short Computer Courses

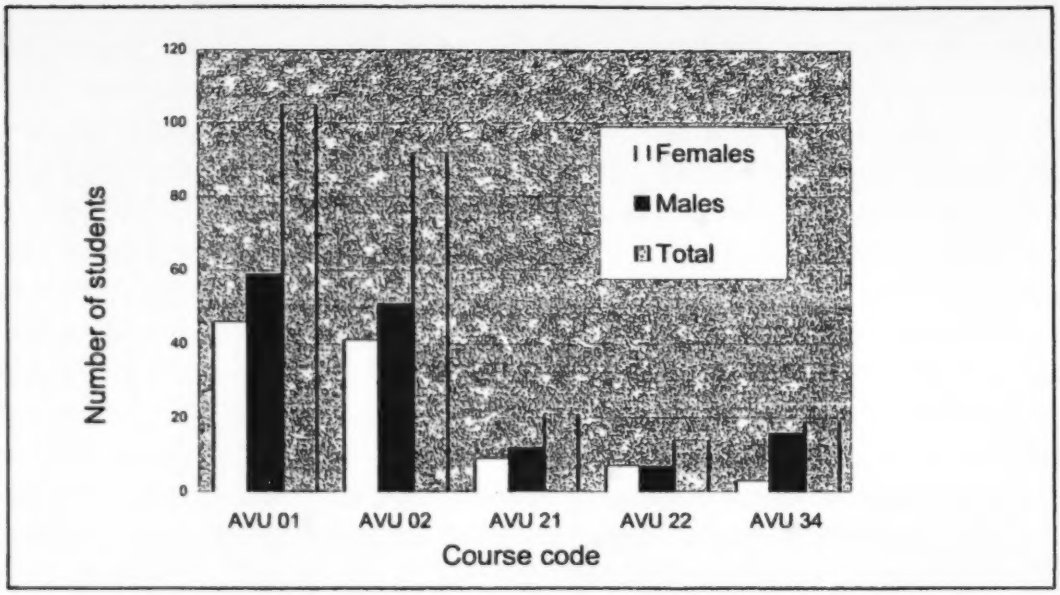

Figure 7. Phase 3: Enrolment in AVU Short Computer Courses

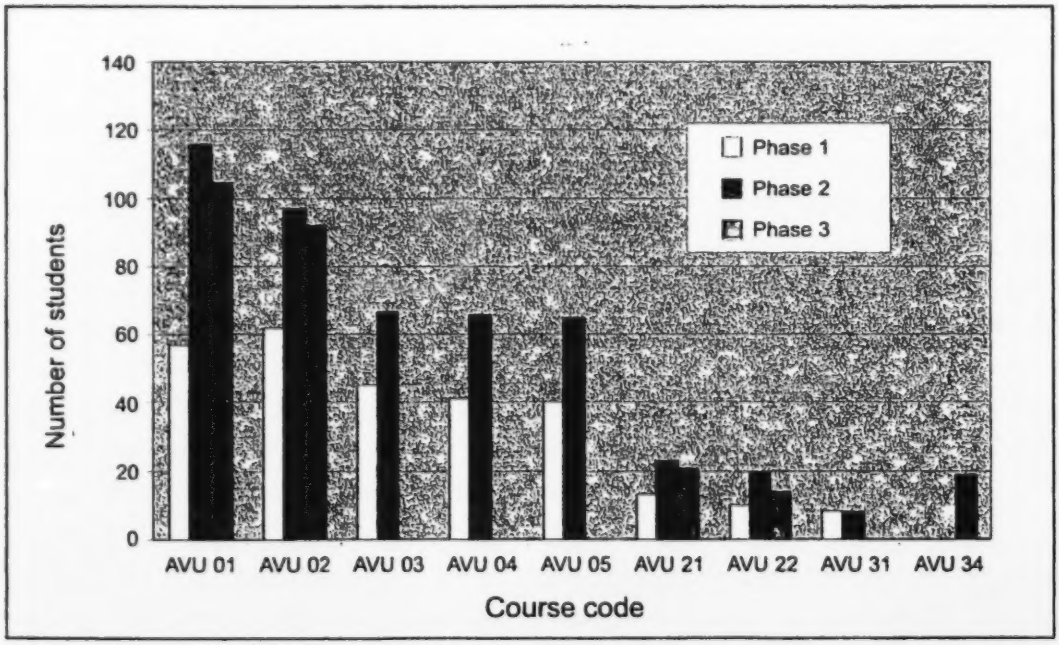

Figure 8. All Phases: Enrolment in AVU Short Computer Courses

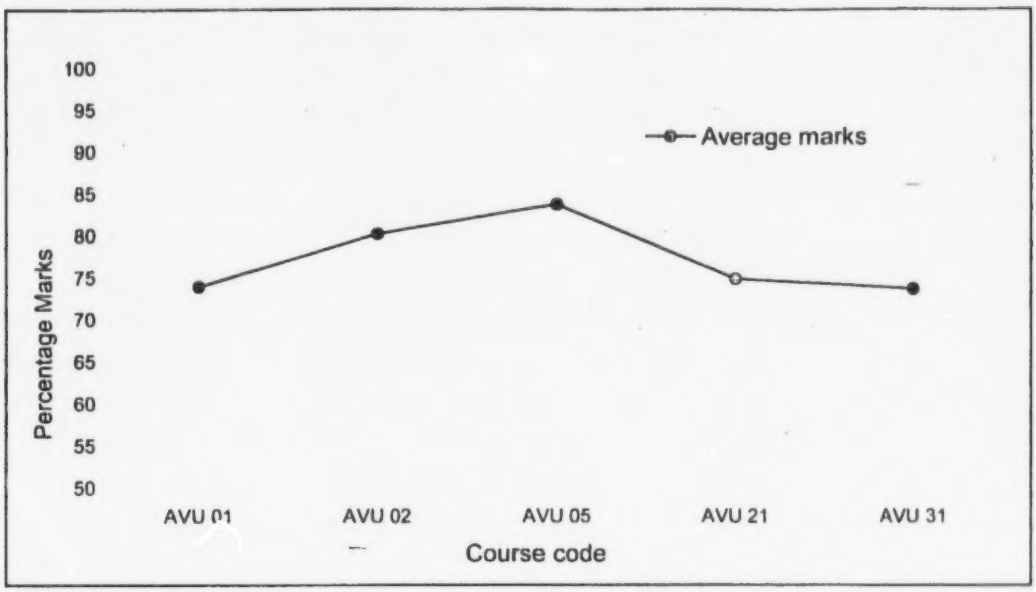

Figure 9. Average Scores in AVU Short Computer Courses, 29 May–24 July 1998

Figure 9 reveals that performance in these computer courses has been very good, with mean scores of over 70 per cent in all courses.

AVU's Pre-University Programme

The computer certificate courses have been extremely popular and generated a good income for the last six months. Although AVU's pilot phase is drawing to an end, short, high quality computer courses will be delivered continuously to interested people.

Programmes such as pre-university have been put in place to prepare students for university degree courses. After advertisement, selection and enrolment, 105 students were admitted to this two-semester programme, with a view to embarking on an AVU degree course in October 1999. Table 10 shows the courses offered and the distribution of students; Figure 10 shows enrolment by gender. Figure 11 represents performance in each

course, and shows clearly that Chemistry 100 had the highest mean score, while Introduction to Computer Science had the lowest, falling below average (50 per cent).

Table 10. Enrolment in AVU's Pre-University Programme

Course	*Number of students*				
	Females	*Males*	*Dropouts*	*Incomplete*	*Total*
Calculus I (Math III)	19	79	4	3	105
Chemistry 100	19	80	4	2	105
Introduction to Computer Science	18	78	4	5	105
Physics 105	20	81	4	0	105

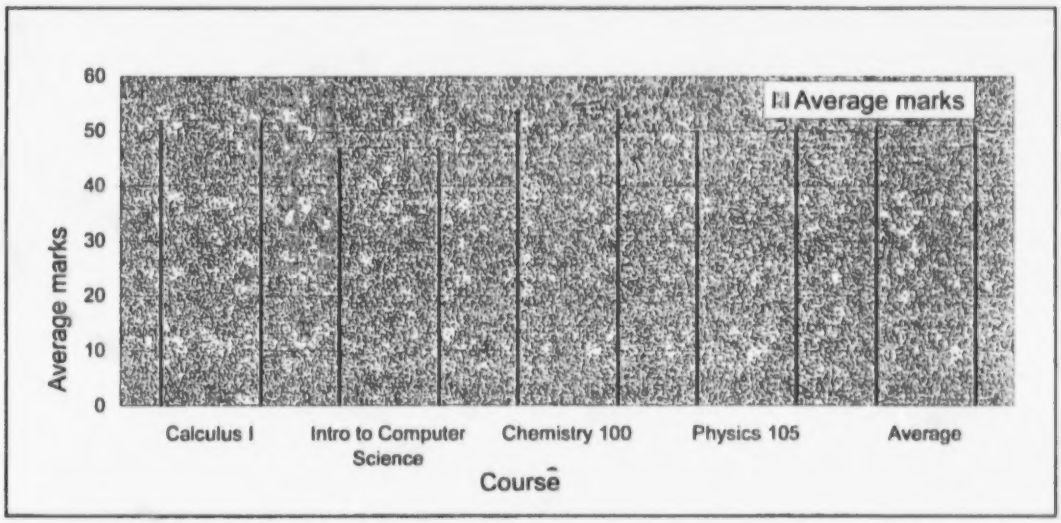

Figure 11 AVU Pre-University Programme, Performance by Course

A summary of marks obtained by each student for all the courses offered is given in Figure 12. Some students did not sit for all the papers, and so some points are missing against their registration numbers in this graph.

Figures 13–16 are for each course and each student's mark is plotted

correspondingly. (Note that the line graphs are broken at the point(s) where the corresponding student did not sit the paper.) With a pass mark of 40 per cent, ten students failed (one scored below 30 per cent in average), and three students scored above 70 per cent, which is grade A. The distribution of scores is given in Table 11.

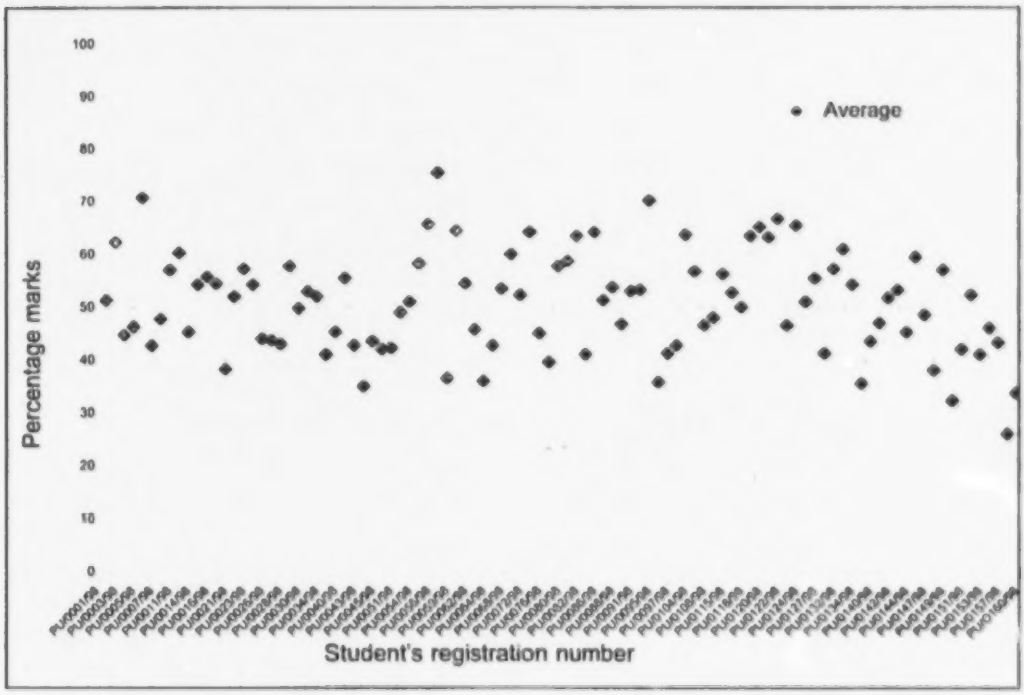

Figure 12. AVU Pre-University Results, Students' Overall Average

The Management of AVU

With outsourcing the preferred mode of operation during the beta phase, the management staff of AVU consists of a small nucleus of full-time employees and a number of short-term, specialist consultants. Accounting and other office support are currently provided by the World Bank. Most of the organisational functions are outsourced in order to keep the organisation lean and focused, and the overhead costs low. Currently

Table 11. AVU Pre-University Programme: Distribution of Scores by Course

Course		*Calculus I (Math III)*	*Chemistry 100*	*Introduction to Computer Science*	*Physics 105*	
Range	*Grade*					*Average*
Above 70%	A	11	11	7	2	3
60–69%	B	17	28	13	20	15
50–59%	C	30	23	22	32	36
40–49%	D	21	25	31	38	37
Below 40%	E	19	12	23	9	10
	Total	98	99	96	101	101
Incomplete cases		3	2	5	–	–

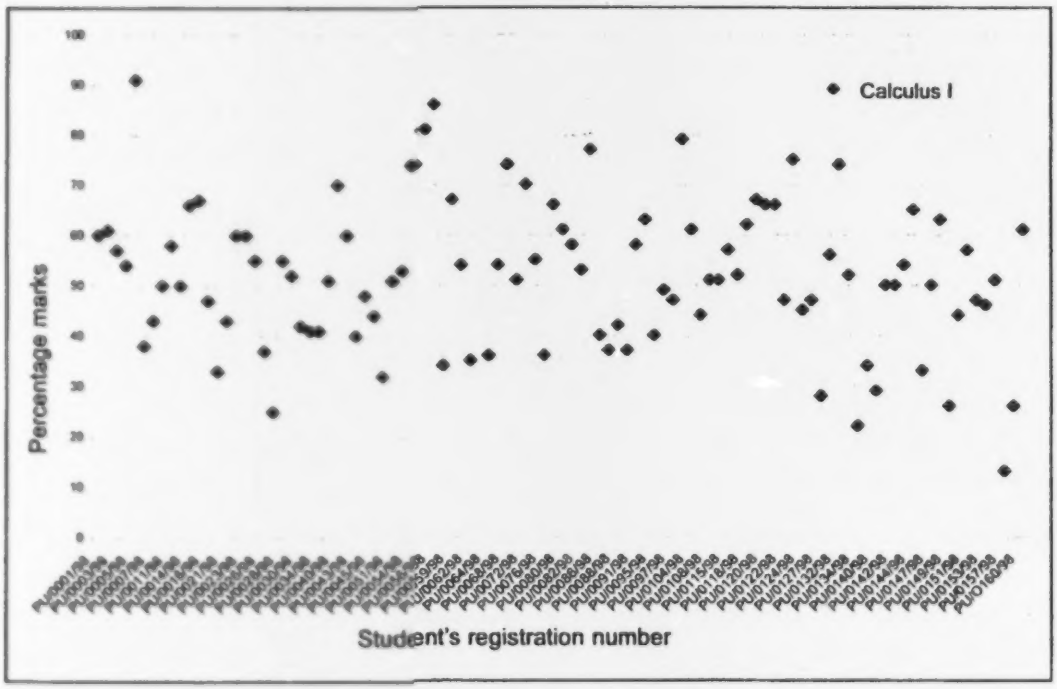

Figure 13. AVU Pre-University Calculus 1 Results

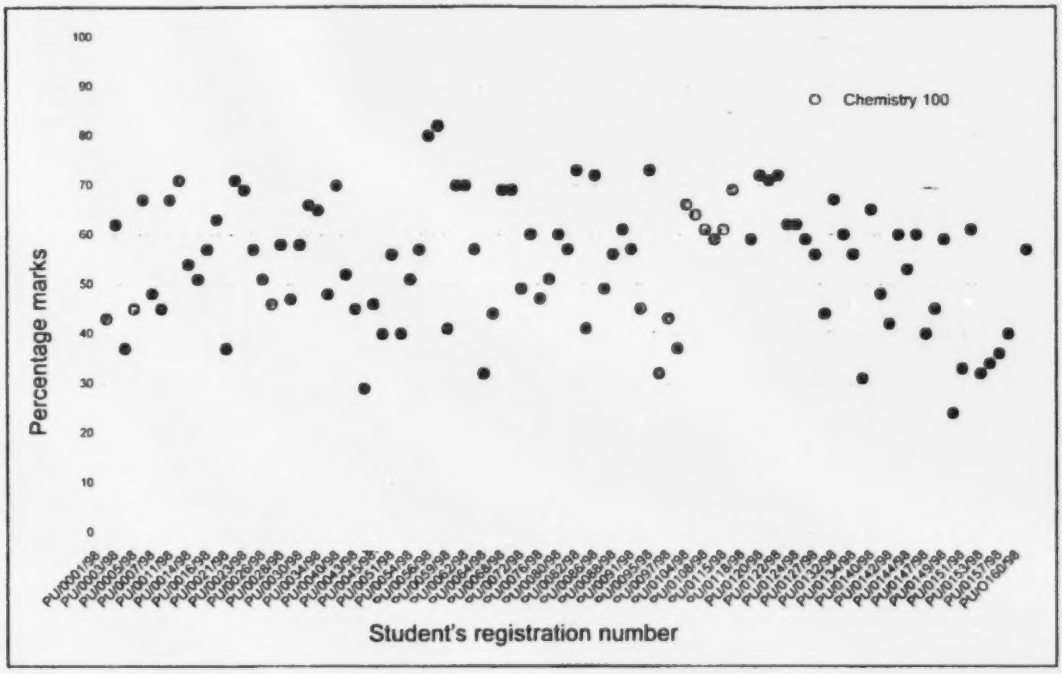

Figure 14. AVU Pre-University Chemistry 100 Results

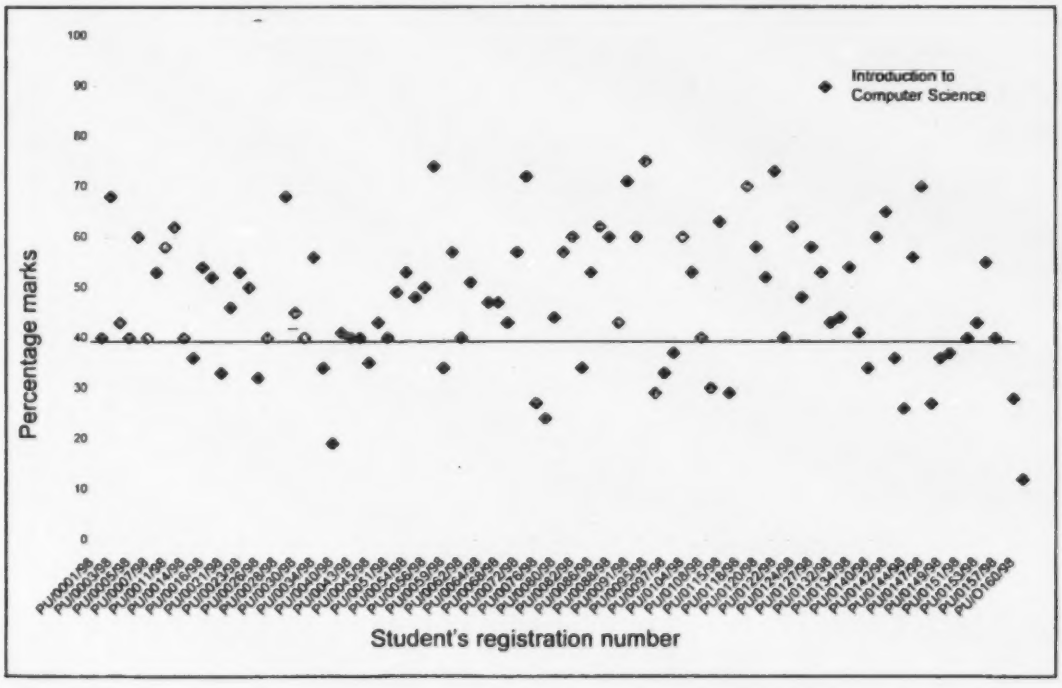

Figure 15. AVU Pre-University Introduction to Computer Science Results

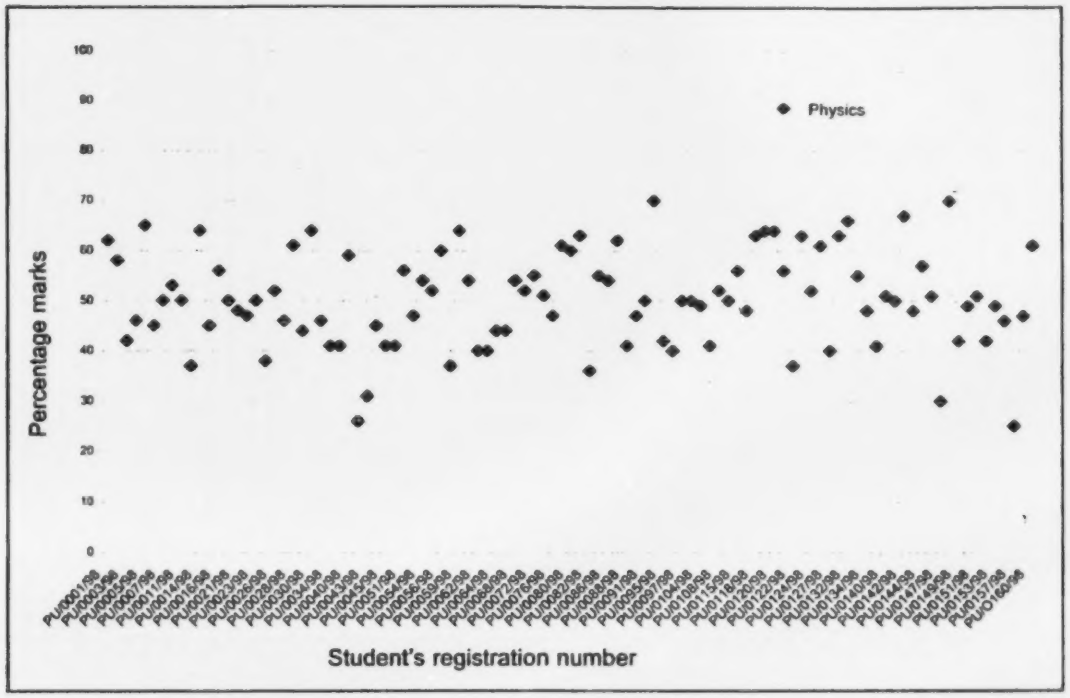

Figure 16. AVU Pre-University Physics Results

AVU management includes: Founder and Chief Executive Officer, Academic Director and Technical Director.

At each participating university, a campus co-ordinator assumes overall responsibility for local implementation of the AVU network. The co-ordinator provides leadership and guidance to faculty and staff members officially assigned to the positions of Course Moderator, Course Facilitator, and Technical Co-ordinator, and to others who assist in day-to-day implementation of the AVU network. Each course is moderated by a local instructor (expert in the discipline) who has the following responsibilities:

- serving as the primary liaison with AVU academic staff;
- grading homework and examinations;
- tutoring and advising students;

- serving as a faculty member to record and assign grades for students registered on the course;
- reviewing and reporting student academic and/discipline problems;
- providing guidance and counselling to students, and support to the course facilitator;
- reviewing the forms, logs and surveys forwarded by the course facilitator, and sending them to the campus co-ordinator for return to AVU; and
- attending training sessions provided by AVU.

The local course moderator is assisted by a junior graduate assistant course facilitator whose responsibilities are:

- facilitating instruction by following schedules, homework, examinations and laboratory work;
- retrieving course materials sent electronically or by other means, and making the required number for class registrants;
- turning and checking the equipment prior to the class;
- recording attendance at each class.

The facilitator assists the course moderator in tutoring and advising students.

AVU Seminars

After adequate marketing of AVU seminars among the business community in Nairobi, 40 executive managers from companies such as Barclays Bank, Standard Chartered Bank, Central Bank, Kenya Commercial Bank, Commercial Bank of Africa and Kenya Breweries attended a seminar on 'Purchasing Policies and Practices' transmitted 'live' from Virginia Technology, USA, on 14 and 21 August 1997. There was an overwhelming response from the business community. During the live seminar, participants interacted with Professor Murphy from Virginia Technology and their counterparts from Uganda, Zimbabwe and Ethiopia.

The virtual seminar was extremely exciting, and drew favourable comments from participants, some of which are reproduced here.

'It is unbelievable that a virtual typical of situations in America is taking place in Kenya. This is the first time in my life to participate in a seminar of this nature.'

'The case study approach gave solutions to practical problems inan organisation.'

'The Seminar was very educative, informative, and enriched what I already knew on purchasing.'

'I feel like I am in Washington D.C. attending EDI seminar, we can ask questions easily and interact clearly with course instructions as if the delivery was face to face. It is so 'real' that I cannot believe we are in Kenya.' Participant at first AVU transmission

Commenting on the technology, one participant emphasised that, 'The use of modern technology enhanced proper learning and sustained our span of concentration.'

This was a very successful seminar which indicated collaboration between the business community and the University. Such support augurs well for sustainability of the project, since participants will be expected to pay for such courses in future.

In addition to the Virginia Technology Seminar, a series of training seminars was organised by the Economic Development Institute (EDI) of the World Bank. Starting on 31 March 1998 , 30 journalists from Kenya

34

attended 14 weekly seminars (from 1900 hours to 2200 hours), delivered by live satellite transmission at Kenyatta University AVU.

The EDI seminars were an income-generating venture – EDI paid AVU-Kenyatta University a total of US$5,000 for using the AVU infrastructure to transmit courses to journalists. Several other important seminars have been held at AVU-Kenyatta, including YK2000 seminars; Balanced Score Card, and Strategy and Innovation.

The Impact of AVU on Kenyatta University

For the seventeen months (from June 1997) that AVU has existed in Kenya, it has had considerable impact on students, faculty members and the entire community. The following achievements have been experienced:

- ***Provision of educational resources.*** One hundred and twenty computers for the AVU enable students to participate effectively in computer courses – Internet Access, Introduction to Computing, Computer Programming C++, Computer Architecture and Organisation. Before the emergence of AVU, the University had extremely limited resources of computers – the Computer Centre had only four computers, and the Mathematics Department three –which were inadequate for courses. Students who enroll for AVU courses are provided with textbooks and notes. The trickle effects of AVU resources have permeated the entire University Science students' community. Internet facilities provided by AVU are utilised by everyone interested in accessing e-mail and internet search. Thus, e-mail facility has modernised the university environment.
- ***Introduction of new courses.*** Computer science as a discipline has never existed in Kenyatta University, but with the emergence of AVU, many computer-based courses have become very popular. The Internet course, for instance, is very new and students find it lucrative since it

opens up job-prospects. As a result of these new information technologies the University, assisted by AVU students, has created a website.

- ***Capacity building.*** A culture of continuing education has been perpetuated through AVU computer-related courses, among professors, lecturers, students and the public. Seminars and workshops have attracted the executive cadre of the business community who find relevant courses via satellite very 'educative and refreshing', especially teleconferencing – interactive technology which empowers them to communicate with their counterparts in Africa and Europe. Enhancement of local capacities to participate in activities within the country and in Africa offers an opportunity for sharing expertise within the region. For instance, qualified engineers – the technical co-ordinator of AVU and the campus co-ordinator – effectively assist in setting up satellite technology in other African countries. This means that Kenyatta University experts assist other countries and enhance sustainability and maintenance of AVU within Africa.

  With regard to courses, AVU will make a significant impact by providing training opportunities to secondary school leavers. Currently, of the estimated 150,000 students who complete secondary school annually, about 7–8 per cent are admitted to universities, and a further 15–20 per cent to other tertiary institutions, leaving over 30 per cent of qualified students without places.

- ***Income-generating and increase in enrolment.*** Through AVU, Kenyatta University will increase its enrolment with students who will pay for AVU degree courses. Currently, interested members of the public pay for short AVU courses in computer-related fields – for example the EDI seminar for journalists generated income for the University. Income generated through AVU courses in 1998 is reflected in Figure 17. Figure 18 shows total AVU expenditure for that period.

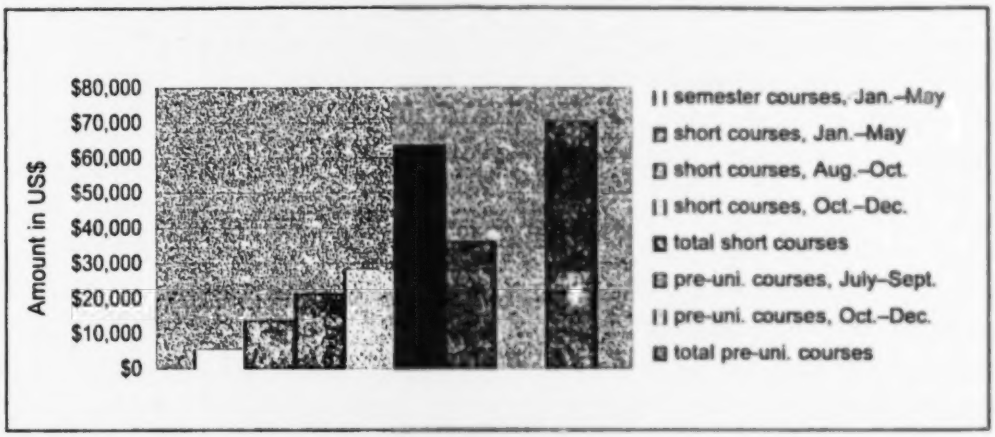

Figure 17. Income Generated through AVU-Kenyatta Courses, January–December 1998

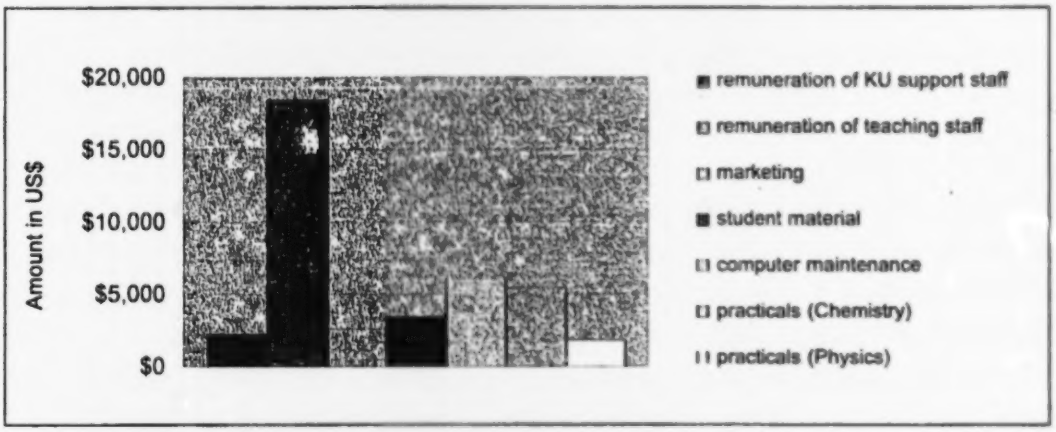

Figure 18. AVU-Kenyatta Total Expenditure, January–December 1998

- ***Digital library.*** AVU maintains a sophisticated internet-based digital library of journals, academic studies and textbooks that allows students and staff to access the world database of information. This web-based resource provides a one-stop-shop for current research materials unavailable in local libraries. Users of the AVU digital library can log on to the database by providing a user name and password in order to connect to various articles, journals and abstracts. The AVU digital

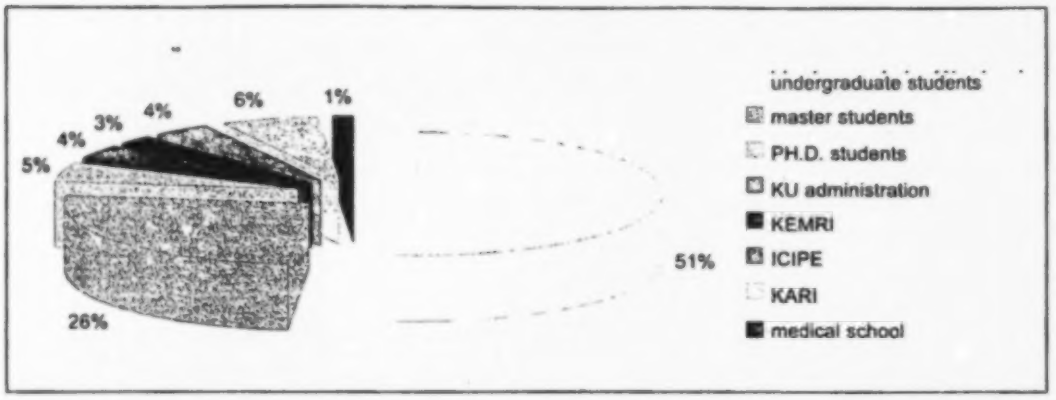

Figure19. The Use of AVU Digital Library, July–December 1998

> *'I used to think that I was one of the best Physics lecturers in the world. But listening to professors from America, and their teaching approaches, I have had to evaluate myself and rate my competence! In essence, I have borrowed some of their case study approaches in teaching, which seems to appeal to my students.'*

library enables accessibility to over 1,700 current journals and texts. However, no part of such material shall be published, stored in a retrieval system or transmitted in any form or by any means, without permission from copyright owners. Library users have access to the database and the opportunity to copy documents within the copyright regulations. Library search is done for those unable to use the internet access facility, at a small fee. At the time of writing, the digital library has been in use for six months. Figure 19 shows the proportions of students, lecturers and researchers who have used it.

- ***Challenge to University faculty members.*** The AVU mode of delivery has challenged some lecturers and unconsciously improved their teaching strategies. The observations of one physics course moderator are reproduced here. The video cassettes recorded during AVU sessions

are used by non-AVU students both for revision and learning new concepts.

- ***AVU virtual laboratories supplement existing resources.*** Faculty members and students share modern virtual laboratory equipment and experiments. Current University laboratories are poorly equipped, and due to lack of resources students have difficulty perform experiments as required. AVU virtual laboratories have come as a 'saviour' to supplement existing scanty resources.
- ***Networking.*** Kenyatta University AVU assists and works together with the Universities of Nairobi and Egerton. Egerton will soon launch AVU. Such collaboration and sharing of resources is a cornerstone for the success of the AVU 'family' in Africa.
- ***Participatory Advocacy of AVU.*** Unlike other projects of the World Bank, where officials initiate a project in Africa and influence its implementation, AVU has a different approach, where participants advocate for its acceptance. Kenyatta AVU is 'our project', not the 'World Bank's Project'.

The Challenges

There are pertinent challenges which impinge on operations of AVU in Africa. The following challenges are significant, particularly to Kenya:

- ***Electricity interruptions.*** Power fluctuations in Africa tend to affect satellite receive terminal, particularly computers. The power 'black outs' or 'change of power' in the case of generators, tend to damage hard disks and sometimes the system boards of computers. For instance, the DELL computers (Seagate) used at AVU-Kenyatta have a lower quality hard disk, which is susceptible in times of irregular power supply, than the QUANTUM, whose hard disk is more resilient and can recover after a black out.

- ***Lack of a clear national communications policy in Kenya.*** Communication services are strategic infrastructure; therefore private ownership of Kenya's telecommunications services is limited. Privatisation and liberalisation go hand-in-hand with ownership, and multinationals have not been given that kind of ownership in Kenya. Telecommunications services are very expensive, for two main reasons: first, Kenya Posts and Telecommunications (KPTC) has a monopoly on services; second, Kenya does not yet own an internet 'hub', and so local internet service providers have hubs in the USA, Canada and Europe. The cost of international links is very high, resulting in expensive internet services for local consumers. AVU relies heavily on the internet and e-mail.
- ***Slow internet connectivity at AVU-Kenyatta.*** Internet access is very slow, due to the mode of connection which is 'dial-up' using a telephone line. The following reasons contribute to slow access:
  - The band width for signal over the telephone lines in Kenya is normally very slow, with the highest rate of transfer averaging 19.2 kbps (kilo bits per second).
  - The telephone line signal is of very poor quality, resulting in average signal loss and errors. AVU therefore suffers from connection cuts and loss of link which make sending and receiving mail frustrating.
  - Heavy access of the internet by users in the Western world creates 'traffic jams'. This happens during the day, interrupting internet courses at the AVU.
  - Frequent 'link' breakdowns due to natural or physical calamities (such as flooding of cables), including breakdown at the KPTC Satellite Earth Station which may last one day, cutting off all forms of telecommunication between the whole country and the outside world; frequent maintenance of KPTC telecommunications

equipment, resulting sometimes in loss of communication for a day or two; telephone problems due to breakdown at the University exchange, blocking out phone calls for hours, and occasional cases of the Internet Service Provider (ISP) pilot telephone line going out of order and causing frustration and anxiety as dialling and connection become very difficult.

These challenges do not in any way undermine the effectiveness and impact of AVU in Kenya. Rather they have influenced AVU Kenyatta to try to overcome the obstacles. At the national level, a bill on Kenya's posts and telecommunications policy is soon to be tabled in Parliament. It is hoped that with a policy framework, postal and communications services will be liberalised and better services ensured.

KPTC is expected to launch a national hub or 'backbone' by end of December 1998. This should facilitate fast and affordable internet access by higher learning institutions.

The Way Forward for the AVU Project at Kenyatta University

The on-going pilot phase generated much enthusiasm and viable prospects for the operational phase, which will start in October 1999. The following measures are being put in place to accommodate the onset of full degree courses during the operational phase:

- ***AVU curriculum development.*** African scholars with expertise in computer science, engineering, physics, chemistry, mathematics and computer engineering were selected to participate in an AVU curriculum development and design workshop in Washington DC in May 1998. Courses have been developed by both African scholars and their counterparts in America, Europe and Canada.

- ***Management and Sustainability of AVU.*** For the operational phase and future sustainability of the project, AVU is to be managed in a business-like manner. Each site will form a business company with limited liabilities. Kenyatta AVU is in the process of forming a company in which the University will have shares. The company will be responsible for generating income and meeting its loan and recurrent costs. The following income-generating courses and activities will be offered at AVU Kenyatta:
  - *Degree courses:* Computer Science, Computer Engineering, and a MBA course;
  - *Diploma courses:* Introduction to Computing and Computer Programming C++;
  - *Certificate short courses:* top-executive seminars in business management; school teachers' seminars in computer education; virtual seminars for journalists; virtual seminars for army officers, etc.;
  - *In-service courses:* professional development courses for professors, lecturers, etc. in computer science, and for secondary- and primary-school teachers;
  - *Digital AVU libraries:* minimal fee charge for faculty members to access information, and (as part of their AVU fees) for students.
  - *Cyber café:* open to students and faculty members at a fee;
  - *Business facility centre;*
  - *Photocopying:* e-mail and fax;
- Internet Service provider (ISP): Kenyatta will soon access a server, and modalities for the service are being put in place. Companies around Nairobi will subscribe to the AVU internet provider;

- Consultancy section: consultancy proposals will be presented to business companies for funding, and projects will be undertaken by the AVU to generate income.

Summary and Conclusions

The rapid expansion of university education and increased enrolment in Kenya and elsewhere in sub-Saharan Africa have not been accompanied by a commensurate rise in the level of government funding, to ensure a high quality of instruction. In many universities there are therefore serious problems related to instructional quality, class sizes and availability of facilities and materials. The AVU, supported by the World Bank, has been initiated to offer new technologies to overcome such barriers. Through the use of digital-satellite technology, programmes in some science subjects are being transmitted from several universities in the North, and these have been well received by both students and staff at Kenyatta University, which is one of the participating universities. The programmes have a high potential for expansion, capacity building, income generation, and networking among universities in sub-Saharan Africa.

Although the AVU programme appears to be a promising innovation, pertinent issues relating to sustainability require serious consideration. Among them is that of cost. The programme is heavily capital intensive, particularly in the purchase and maintenance of the satellite receive terminal equipment which host universities will have to shoulder after World Bank assistance is phased out.

With proper management, accountability, strategic planning and marketing of AVU programmes, there is great hope and promise for AVU in revitalising university systems in Kenyatta and inculcating the notion of income-generation and self-reliance in university management.

References

AVU (1997), *The Campus Co-ordinator Manual for 1997* Prototype Phase.

AVU (1997), *The Course Co-ordinator Manual for the Prototype Phase*.

AVU (1997), *Inaugural Training Workshop Manual: Addis-Ababa 16–21 February*.

Baranshamaje, E., *The African Virtual University*, concept paper, Washington DC.

Harris, H. (1996), *The African Virtual University Library*, Washington DC.

Juma, M.N. (1997), *AVU Progress Reports*, Kenyatta University.

Republic of Kenya (1997), *Economic Survey 1997*, Nairobi, Government Printer.

Sifuna, D. N. (1997), *The Governance of Kenyan Public Universities*, Education Research Series no. 1, Nairobi, Lyceum Educational Consultants.

World Bank (1998), *Education in Sub-Saharan Africa, Policies for Adjustment, Revitalization and Expansion*, Washington DC, World Bank.

African Virtual University

The Case of Kenyatta University, Kenya

MAGDALLEN N JUMA

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This case study relates to the pilot phase of the African Virtual University at Kenyatta University in Kenya. It provides one of the few available insights into the reality of how the AVU has progressed in terms of concept, strategy and practice. It describes and analyses key issues regarding courses offered, operational economics, practical difficulties and the growing institutionalisation of the AVU as an integral part of higher education in Kenya. It therefore provides a crucial source of information and evidence on how the concept of a virtual university is being translated into reality in the context of an African country.

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